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ABSTRACT

This review of 17 projects funded during fiscal year 1974 under part C of the Vocational Education Amendments of 1968 for the priority "Manpower Information and Systems" (MIS) begins with an examination of the priority statement under section 131 (a) of part C and a classification of projects by the five categories in this statement. (The five categories determined by section 131 (a) were improving manpower projections, matching job requirements to skills of workers, improving the accuracy of manpower projections, translating manpower forecasts into programs/curriculum, and interfacing vocational education with economic development.) Following project classification, a framework (developed from the five categories) for examining the MIS projects is discussed. Elements of this framework are listed and explained. The major portion of this report is a brief description of each of the projects' accomplishments, highlighting the purpose, source of data, and findings. Conclusions resulting from the review of the final reports comprise the final section of this report. Two of the conclusions presented follow: (1) The manpower information and system priority was stated so broadly that it excluded little in the way of project focus or methodology, consequently, project reports were extremely diverse. (2) In the process of preparing the review and synthesis report, one question was raised several times "What are the best manpower information and system techniques for the Nation, State, or local level?" The reports did not provide an answer to this question. (SH)

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MANPOWER INFORMATION SYSTEMS

A Review and Synthesis of Information of FY 74 Projects Supported under Section 131 (a) of Part C of the Vocational Education Amendments (P.L. 90-576)

by
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U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

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PREFACE

This report, sponsored by the United States Office of Education (USOE), is a review and synthesis of Part C projects funded during fiscal year 1974 for the priority entitled "Manpower Information and Systems." The report has been prepared by the AIM/ARM* staff for USOE to answer some of the findings and concerns of the 1974 General Accounting Office report on "What Is the Role of Federal Assistance for Vocational Education?"

Final reports from 17 of 20 Part C FY74 projects were reviewed and studied for their contributions of the priority statement and manpower information systems in general. These notes were organized into an initial draft (Draft No. 1) of "Manpower Information Systems" and reviewed by representatives of the Department of Labor, Bureau of Labor Statistics, the U.S. Office of Education, and the Center for Occupational Education at North Carolina State University. After this initial critique, the report was revised. The revision was presented to a group of practitioners at a conference as a presession to the American Vocational Association (AVA) in Houston, Texas on December 3, 1976. Suggestions made by conference participants have been incorporated in this version of the report. Conference participants represented state, local and national perspectives on development and operation of manpower information systems.

A review and synthesis of funded project reports has some obvious limitations such as:

- interpretations of report content;
- quality of report writing;
- omission of project background information which may have affected the final report; and
- intended target audiences of individual reports.

This review and synthesis report of FY74 projects should not be considered a current summary of manpower information and systems for several reasons:

- new projection-technologies have been developed;
- project results have precipitated changes in USOE administration;
- new legislation for vocational education has supported recommendations for a national manpower system;

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*AIM/ARM. *Abstracts of Instructional and Research Materials in Vocational Education* prepared for the U.S. Office of Education by The Center for Vocational Education. 1977 is the beginning of Volume 10 of AIM/ARM.

- joint efforts for manpower planning between the Department of Labor and USOE are underway; and

- the change in terminology—from "manpower" to "employment and training"—has created some confusion in identifying the activities of the Department of Labor.

All of these factors have had some effect on the reporting of manpower information and systems projects. These projects are really a "snap shot" of part of the larger manpower information reporting activities throughout the nation.

EXECUTIVE SUMMARY

Based on the review of the final reports from projects funded during FY74 under Part C of the Vocational Education Amendments of 1968 (P.L. 90 576) the following conclusions are presented:

1. The manpower information and system priority was stated so broadly that it excluded little in the way of project focus or methodology. Consequently, project reports were extremely diverse.

2. The project reports were basically compliance documents. They seemed not to deal systematically with project contributions to the information needs stated in the funding priority.

3. A key issue identified in the review of methodologies is the source and use of data. Manpower information and data can be obtained from secondary sources such as existing reports and publications from other agencies, or raw data can be collected for specific needs.

4. In the process of preparing the review and synthesis report, one question was raised several times: "What are the best manpower information and system techniques for the nation or state or local level?" The reports do not provide an answer to this question.

5. The review and synthesis was prepared from studying the final reports of Part C projects. An attempt was made to fit these diverse activities and accomplishments into a framework that provides continuity. However, while the framework was helpful in reviewing the projects, it did not identify an existing procedure or mechanism for incorporating project findings into a coordinated information system.

6. Since the FY74 Part C Manpower Information and System Projects were funded, the U.S. Office of Education in the Department of Health, Education and Welfare (DHEW) and the Department of Labor (DOL) have signed an interagency agreement to coordinate activities and work cooperatively for the improvement of manpower information systems and data. This cooperative agreement, together with the passage of the Education Amendments of 1976, reaffirms the need for manpower information to be used in projections, program planning and upgrading the skills of individuals.

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MANPOWER INFORMATION SYSTEMS

Introduction to the Report

The purpose of this report is to review, synthesize, and disseminate information about the 20 projects that were supported in FY74 by the U.S. Office of Education under the Manpower Information and System priority. The review begins with an examination of the priority statement and a classification of projects by categories in this statement.

The research priority for fiscal year 1974 (FY74) under authority of Section 131 (a) of Part C of the Vocational Education Amendments of 1968 (VEW 1968–P.L. 90-576) stated that studies would be supported to ". . . improve manpower, job, labor market and demographic information relevant to the needs of Federal, state and local educational administrators, planners, evaluators, and other groups." Specifically, the USOE priority statement on the Manpower Information and System (MIS) priority was:

> *Manpower Information and System for Education* – Job, manpower, labor market, and demographic area are required by public, private, and proprietary educational administrators, planners, evaluators, curriculum developers, career counselors, teachers, and students. Manpower information needs to be current and appropriately presented if vocational education programs are to be responsive to existing and projected employment opportunities. Applied studies will be supported to improve manpower, job, labor market, and demographic information relevant to the needs of Federal, State, and local educational administrators, planners, evaluators, and other user groups. These studies should produce information which will: (1) provide a basis for improving manpower projections for educational uses at the State and local levels, (2) provide a basis for matching job requirements to the skills of prospective workers, (3) provide a basis for improving the accuracy of manpower projections for jobs, (4) translate manpower forecasts into program and specific curriculum requirements, and (5) provide the basis for vocational education to interface with economic development groups and to assist in job development approaches. [Section 131 (a), P.L. 90 576]

One way to examine these MIS projects is to categorize them according to parts of the priority statement. This has been done in the following pages. Referring to MIS projects the priority statement specifies:

These studies should produce information which will:

(1) provide a basis for improving manpower projections for educational uses at the State and local levels;
(2) provide a basis for matching job requirements to the skills of prospective workers;

(3) provide a basis for improving the accuracy of manpower projections for jobs;
(4) translate manpower forecasts into program and specific curriculum requirements; and
(5) provide the basis for vocational education to interface with economic development groups and to assist in job development approaches.

Each of the projects are placed in one or more of the five categories in Table 1. A brief statement about each category is provided in the following sections.

Improving Manpower Projections

The priority statement states that projects will be . . . "providing a basis for improving manpower projections for educational uses at the state and local levels." Projects placed in this category include: the national study of state manpower information systems by Whinfield (No. 1)*; the 9 county study in Kansas by Rawson (No. 4); the Choctaw Indian Survey by Spencer and others (No. 6); the study by Stevens in Missouri (No. 7); the seminar for state and local directors by Vivian (No. 13); the management information system by Velez (No. 15); the development of a regional information system by Bice and Smith in Tennessee (No. 17); and the mini projects on a forecasting model for Vocational Education in Washington state by Wimer and others (No. 20).

Matching Job Requirements to Skills of Workers

The second part of the priority statement states that projects will ". . . provide a basis for matching job requirements to the skills of prospective workers." Two projects appear to address this statement: the national study of 123 occupations by Lecht and others (No. 2); and the project by Bonner (No. 19) which sought and provided job information to rural disadvantaged populations.

Improving the Accuracy of Manpower Projections

This part of the priority statement concerns projects that are to ". . . provide a basis for improving the manpower projections for jobs." It appears that only the project directed by Morton (No. 11) which compared two manpower projection techniques addressed this issue.

Translating Manpower Forecasts into Programs/Curriculum

This part of the priority dealt with projects which are to ". . . translate manpower forecasts into program and specific curriculum requirements." Four studies addressed this area: the project reported by Fisher and others (No. 5) used forecasting techniques and task inventories for curriculum development; the New York (No. 9) project reported by Seckendorf that designed and tested an instructional management system for occupational education; the project directed by Schroeder (No. 12) provided a national exchange for task inventories which were used in curriculum development; and the project directed by Gilies (No. 14) which developed a curriculum management system to be used with manpower information.

Interfacing Vocational Education with Economic Development

This part of the MIS priority states that funded projects ". . . provide the basis for vocational education to interface with economic development groups and to assist in job development

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*Project Number (No. 1, 2, 3, etc.) refer to the order in which they appear in tables and in the section of abstracts.

TABLE 1

Part C FY74 Projects by MIS Priority Category

	PROJECT DIRECTORS	PROJECT TITLES	MIS PRIORITY CATEGORIES 1 Improving Manpower Projections State/ Local Level	2 Matching Job Requirements to Skills of Workers	3 Improving the Accuracy of Manpower Projections	4 Translating Manpower Forecasts Programs/Curriculum	5 Interface of V.E. with Economic Development
1.	Richard W. Whitfield Department of Higher, Technical and Adult Education University of Connecticut Storrs, Connecticut 06268	*A Comparative Study of State Staffing Patterns and Delivery Systems of Vocational Education and Their Relative Effectiveness*	X				
2.	Leonard Lecht, Marc A. Matland, Richard Rosen The Conference Board 845 Third Avenue New York, New York 10022	*Changes in Occupational Characteristics in the Next Decade: Their Implications for Planning in Vocational Education*		X			
3.	Illinois*						
4.	Wilbur A. Rawson Kansas State Department of Education Vocational Education Division 120 East Tenth Street Topeka, Kansas 66612	*A Research Project in Developing a System for Comprehensive Vocational Planning for Local Schools in Kansas*	X				
5.	Harold S. Fisher, Eddie A. Moore, D. Douglas Schneider Muskegon Area Independent School District Muskegon, Michigan 49442	*A Study of Job Demands and Curricular Development in Agricultural Training Related to the Muskegon County Wastewater Management System*				X	
6.	Barbara G. Spencer, John H. Peterson, Jr., and Choong S. Kim Mississippi Band of Choctaw Indians Route 7, Box 21 Philadelphia, Mississippi 39350	*Choctaw Manpower and Demographic Survey 1974*	X				
7.	David W. Stevens Human Resources Research Program University of Missouri-Columbia Columbia, Missouri 65201	*A "Hands On" Information System for for Vocational Education Planning*	X				

Table 1 (Continued)

	PROJECT DIRECTORS	PROJECT TITLES	MIS PRIORITY CATEGORIES 1 Improving Manpower Projections State/ Local Level	2 Matching Job Requirements to Skills of Workers	3 Improving the Accuracy of Manpower Projections	4 Translating Manpower Forecasts Programs/Curriculum	5 Interface of V.E. with Economic Development
8.	Nebraska*						
9.	Robert S. Seckendorf New York State Education Department Office of Occupational and Continuing Education Albany, New York 12230	*Comprehensive Instructional Management System for Occupational Education in New York State*				X	
10.	G. William Porter Center for Occupational Education North Carolina State University Post Office Box 5096 Raleigh, N.C. 27607	*Data Needs in Vocational Education "The Development of a Minimal Information System to Satisfy the Needs of Selected User Groups"* (Project ED NEED)					X
11.	J. B. Morton Oklahoma State Department of Vocational and Technical Education 1515 West Sixth Avenue Stillwater, Oklahoma 74074	*The Comparative Efficacy of Selected Manpower Demand Projection Techniques on Diversified Populations (January 1976)*			X		
12.	Paul E. Schroeder The Center for Vocational Education The Ohio State University 1960 Kenny Road Columbus, Ohio 43210	*Task Inventory Exchange* (TIE)				X	
13.	Neal E. Vivian The Ohio State University 190 North Oval Drive Columbus, Ohio 43210	*Manpower Information Research Training Project*	X				
14.	Donald M. Cilles, Coordinator Program Development and Evaluation Oregon Department of Education 942 Lancaster Drive NE Salem, Oregon 97310	*A Statewide Manpower/Curriculum Management* (March 1976)				X	
15.	Vidal Velez, Director Research Coordinating Unit Commonwealth Department of Education Cesar Gonzales and Calaf Streets Hato Rey, Puerto Rico 00919	*Management Information System*	X				

Table 1 (Continued)

	PROJECT DIRECTORS	PROJECT TITLES	MIS PRIORITY CATEGORIES 1 Improving Manpower Projections State/ Local Level	2 Matching Job Requirements to Skills of Workers	3 Improving the Accuracy of Manpower Projections	4 Translating Manpower Forecasts Programs/Curriculum	5 Interface of V.E. with Economic Development
16.	Gary J. Lashway and Connie B. Miller South Carolina State Department of Education Office of Vocational Education 908 Rutledge Building 1429 Senate Street Columbia, South Carolina 29201	*Vocational Management Information Interface Study*					X
17.	Gary R. Bice and Genevieve D. Smith Tennessee Research Coordinating Unit for Vocational Education The University of Tennessee College of Education Knoxville, Tennessee	*Development and Implementation of a Model Regional Information System for Vocational Technical Education* (January 1976)	X				
18.	Texas*						
19.	Harold S. Bonner Prairie View A & M University Post Office Drawer A Prairie View, Texas 77445	*An Employment Agency Model for Providing Job Information to Rural Disadvantaged Populations*		X			
20.	Frank H. Wimer Washington State Commission for Vocational Education Olympia, Washington 98504	*FORECASTING MODEL Statewide Manpower Projections for Vocational Education*	X				

*Reports were not received by CVE in time to be included in the review and synthesis.

approaches." Perhaps all projects were involved in this activity to some degree. However, only two projects appeared to stress the interface idea. These were the Puerto Rico project directed by Velez (No. 15) and the "interface" study by Lashway and Miller (No. 16) in South Carolina. Velez reported the development of a manpower information system for vocational education and Lashway/Miller described the manual to computer conversion of manpower reporting for vocational education.

Summary

Almost all of the projects listed in Table 1 were in the development stage. Some included the development and testing of models (7, 10, 11, 14, 15, 17, and 19), others were reports of national, state or local studies (1, 2, 4, 5, 12, 13, 16, and 20), and one was the report of a demographic survey (No. 16) which would be used for program planning or curriculum development.

It should be noted, however, that the projects were arbitrarily assigned to categories based on project titles, review of project reports and reported project activities. Final reports did not identify the part of the MIS priority that they studied.

Review of FY74 Part C Projects

The priority statement cast manpower information systems in a mode of gathering data for use in determining:

1. Manpower (which could include persons who are available for employment);
2. Job(s) (which might also include occupational information);
3. Labor market (e.g., potential demand);
4. Demographic information (e.g., data on people in the local area); and
5. Information relevant to the needs of educational administrators (such as education and training available to individuals seeking employment or changes in employment situations).

A framework for closer examination of the final reports of the MIS projects has been developed from the above five categories. This review framework is illustrated in Figure 1. Elements of this review framework are listed below and then explained in subsequent sections. The elements are intended as a guide for examining each of the 20 projects.

A. Occupational information (i.e., information about jobs and employment)

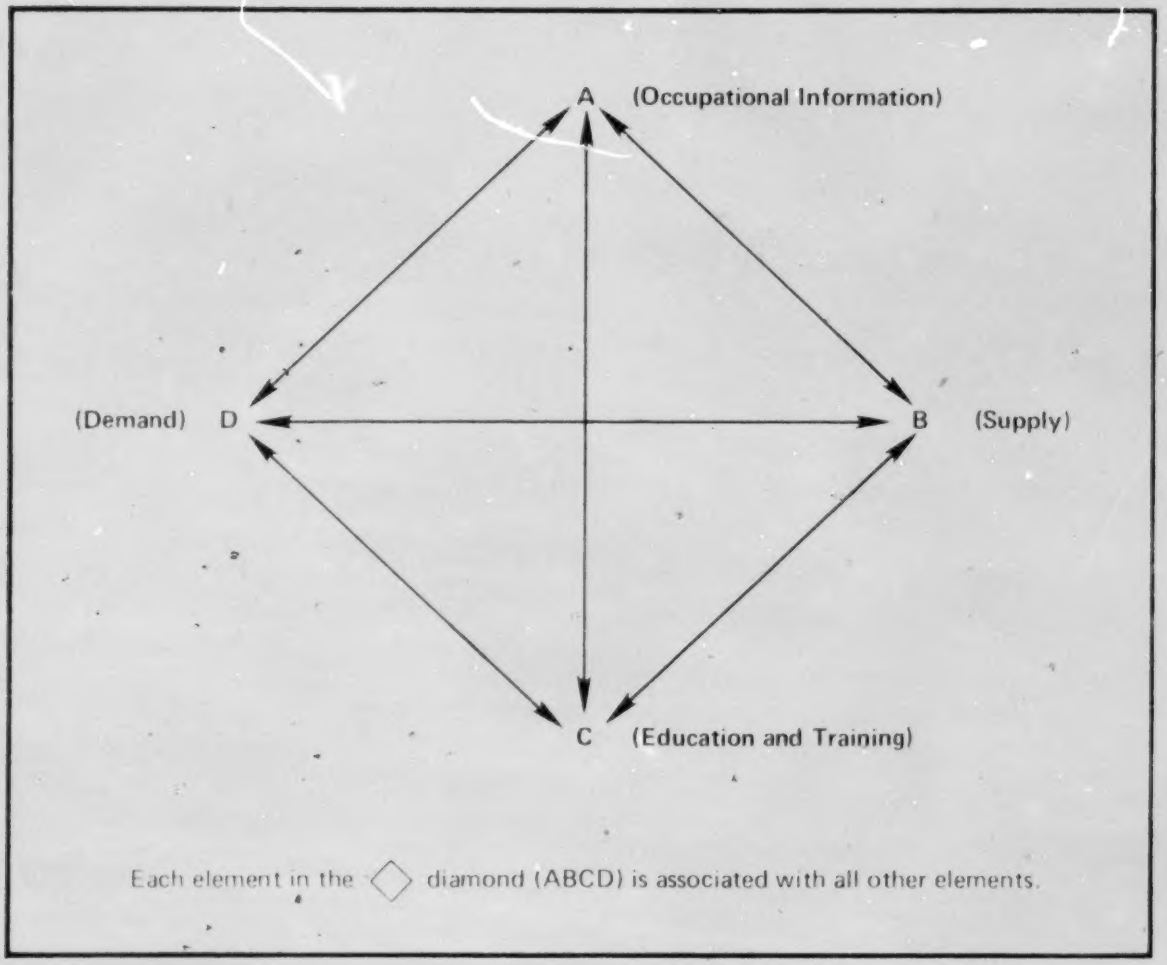
B. Supply (i.e., people available for jobs)

C. Education and training (i.e., experiences available to people for changing their employment qualifications)

D. Demand (i.e., jobs which are available and could be filled by qualified people)

FIGURE 1

Schema of Relations Between Key Elements
of the Review Framework


A (Occupational Information)
(Demand) D
B (Supply)
C (Education and Training)
Each element in the ◇ diamond (ABCD) is associated with all other elements.

Occupational Information (A)

This element describes particular features of a job or occupation. It should be current and factual. Wirtz states (1975, p. 34): "Too many young people are unquestionably being educated and trained for prospects that turn out to be illusions." What are the features of the job? What is to be done? How? By whom? If a person takes this position what is his or her life style? What is the salary? Where are these jobs most available? What are the safety hazards? Is there a requirement for special training? These and other questions should be answered so that individuals may identify and understand jobs.

Manpower information systems should provide occupational information. Occupational information clarifies the specifics of a particular job or task to be performed. Education and training experiences can be built around occupational information. Items[1] that describe occupational information include:

1. Occupation duties and responsibilities
2. Interests
3. Aptitudes
4. Working conditions
5. Physical demands
6. Temperaments
7. Type of companies (industries) which hire in an occupation
8. Educational requirements by occupation
9. Methods of entry to an occupation and entry wage rate
10. Advancement opportunities (career ladders)
11. Training time required (specific vocational preparation)
12. Educational development (general educational development)

Supply (B)

This element asks *what* people, with *what* skills, are available for employment: skilled people, both adults and youth, constitute the supply for specific occupations. Supply includes the employed, unemployed and underemployed.

Knowing the need (demand) for a certain number of employees for a job is directly linked to the occupational information and supply elements. If there are people in the supply "pool" who need skills developed, upgraded, or updated the concept of education and training becomes important.

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[1] Items cited for the framework (A, B, D, and D) from correspondence with Bryan Richey, U.S. Department of Labor, Dallas, Texas.

Items that help describe supply information include:

1. Age
2. Sex
3. Race
4. Occupation
5. Industry
6. Education
7. Sources of supply
    a. Institutional
        (1) Specific training (vocational or technical)
        (2) Nonspecific or general training
    b. Noninstitutional training (OJT)
    c. Workers outside the labor force
    d. Occupational transfers
    e. Migration

The relationship of supply to demand (D) is not as direct as one would think (Stevens, 1976). People may fill positions only if the position is available and employers are actually hiring for a particular job. Supply can equal demand when the three ingredients of qualified people, a job opening, and actual hiring for a job interact.

Education and Training (C)

This element is the means by which society helps individuals prepare for employment. This may be public or private, formal or informal. "Most young peoples' career development now includes a combination of two or more kinds of training, general education, public or private specialized training at either the secondary or postsecondary level, on-the-job training, and so forth." (Wirtz, 1975, p. 36)

Education and training are the most common means of preparing an individual for a particular position. This activity may take the form of on-the-job training, apprenticeships, formal classroom instruction, informal study and competency examinations, and cooperative education with in-class and on-the-job instruction.

Items that help describe education and training include:

1. Major education and training programs
    a. Regular school programs
    b. Federally sponsored programs
    c. OJT
2. Training time involved

3. Minimum education required

4. Facility where training is offered

Occupational information (A), supply (B), and demand (D) appear to be directly related to education and training (C). Information about the type of jobs available and their requirements can be used for program planning and curriculum development. If there is an oversupply (i.e., elementary teachers) action can be taken to retrain (e.g., aircraft engineers in the Northwest to environmental protection engineers in the South) people for related jobs.

Demand (D)

This element is the intensity of need for employees in an occupation. Technology influences, among other factors, the demand for employees with certain qualifications. For example, the need for computer programmers was very great in the 1960's. Many industries and businesses began using computers for accounting and this demanded computer programmers. Today, most of the accounting conversions have been completed and more sophisticated computers are being used which require even more highly skilled individuals. Demand for programmers was high in the 1960's, lowered in the early 1970's, and is shifting to more advanced skills in the late 1970's.

Items that help describe demand include:

1. Industry estimates and projections

2. Staffing patterns of industries

3. Occupational projections

   a. Occupation within industry
   b. Cross industry
   c. Net change in demand for workers by occupation

4. Short range and long range projections

5. By labor area

Information about current and future skills enables employers to hire the best available persons (supply) for jobs. If these persons are available but not skilled then some form of education or training may be designed to upgrade individuals to acceptable competence levels.

Use of the Framework

The four key elements (i.e., occupational information, supply, education and training and demand) can be used to describe similarities and differences between the 20 projects. Manpower information system projects funded in FY74 by USOE are categorized within this framework in Table 2. The framework allows the reader to get an overview of the various project efforts for future reference. The table provides a quick reference to the project descriptions found in one of the following sections of this report.

TABLE 2

Manpower Information Systems
Part C, FY74 State Projects and Their Emphasis and Scope

PROJECT BY STATE	PROJECT EMPHASIS				SCOPE			
	(A) Occupational Information	(B) Supply	(C) Education & Training	(D) Demand	National	Multi-State	State	Local or Region Within State
1. Richard Whinfield University of Connecticut Storrs, Connecticut			X		X			
2. Leonard Lecht et al. Conference Board Washington, D.C.		X		X				
3. Illinois*								
4. Wilbur Rawson Topeka, Kansas	X		X					X
5. Harold S. Fischer et al. Muskegon Area Independent School District Muskegon, Michigan	X		X	X				X
6. Spencer et al.* Choctaw Demographic Survey Philadelphia, Mississippi		X						X
7. David W. Stevens University of Missouri Columbia, Missouri		X		X			X	
8. Nebraska*								
9. Robert S. Seckendorf New York State Education Department Albany, New York	X		X				X	
10. G. William Porter EDNEED Raleigh, North Carolina	X	X		X	X			

Table 2 (Continued)

PROJECT BY STATE	PROJECT EMPHASIS				SCOPE			
	(A) Occupational Information	(B) Supply	(C) Education & Training	(D) Demand	National	Multi-State	State	Local or Region Within State
11. J. B. Morton Oklahoma State Department of Education Stillwater, Oklahoma		X		X			X	
12. Paul E. Schroeder The Ohio State University The Center for Vocational Education Columbus, Ohio	X		X		X			
13. Neal Vivian The Ohio State University Columbus, Ohio		X	X	X		X		
14. Donald M. Gilles Oregon State Department of Education Salem, Oregon			X	X			X	
15. V. V. Velez Hato Rey Puerto Rico		X		X			X	
16. *Lashway and Miller South Carolina Department of Education Columbia, South Carolina		X					X	
17. Bice and Smith Tennessee RCU Knoxville, Tennessee	X	X	X	X		X		
18. Texas*								
19. Harold S. Bonner Prairie View A & M University Prairie View, Texas		X		X				X
20. Frank Wimer Washington State University Pullman, Washington		X		X			X	

*Reports were not received by CVE in time to be included in the review and synthesis.

Description of Final Reports

As mentioned before, 20 projects were funded during FY74 under Section 131 (a) of Part C of the Vocational Education Amendments of 1968 (P.O. 90-576). They were funded under a national research priority identified as Manpower Information and Systems. This section includes a brief description of accomplishments, as stated in final reports submitted to USOE by the respective project directors. These descriptions were designed to highlight the *purpose, source of data,* and *findings* of projects. Project directors were given the opportunity to review and change these brief comments. Some suggested changes; others did not.

The reader is referred to the full text of each report to draw his or her own conclusions about its content and contribution to manpower information systems. This section of the report attempts to reduce the reading of final reports and related documents to a single volume. In order to accomplish this task some material has obviously been omitted. Further, the style of writing, content and contribution of the final reports toward the development and study of manpower information systems varied. The brief descriptions of each report reflect the authors' attempt in gathering information from these reports.

No. 1

A Comparative Study of State Staffing Patterns and Delivery Systems of Vocational Education and Their Relative Effectiveness

Richard W. Whinfield
Department of Higher, Technical and Adult Education
University of Connecticut
Storrs, Connecticut 06268

Purpose of Project

The study grows out of an increasingly apparent need for better planning to achieve maximum productivity with finite dollars. This report addressed itself primarily to administrative processes, rather than the end product, with emphasis on:

1. The role of the federal dollar
2. How vocational education is planned
3. How the federal vocational funds are distributed
4. How training resources are used
5. The relationship of training to employment

Among the major concerns was the observation that "information is inadequate or unused" and that there is "underuse" of data. (Final Report, p. 1)

Source of Data

The major variables in this study are: (1) state administrative structure, (2) delivery systems, and (3) effectiveness of output. Certain elements of each of these three dimensions were examined to ascertain whether there are interrelationships. (Final Report, p. 3)

Statistical data for the study was obtained from states and from *Project Baseline*, and some information came from other sources. *Baseline* data was compared to similar information from USOE which was comprehensive and presented in a greater variety of ways. The *Baseline* project director confirmed that *Baseline* data had been carefully developed. Visitations to states plus numerous telephone calls and conferences had been conducted for verification.

Efforts were made to draw data from all but three of the state plans for 1970 71 and 1972 73. State plans were reviewed and data was extracted, but in general the information in the plans wasn't useful. State advisory committees were asked to submit annual reports and some interesting reports were submitted but since there was not consistency of content, there was little that could be drawn from them.

Because there was no single source of information which described delivery systems in the way desired in this study, an effort was made to generate a delivery system data base. A questionnaire was developed and pretested. Forty-two states returned the questionnaire and 39 questionnaires were usable for certain statistical data. Efforts to get complete data included follow-up letters and telephone calls.

Because the data was to be primarily descriptive, it was felt that a 100 percent response was not necessary to get a broad demonstration of most alternative delivery systems.

Findings

"*Placement* is not a good dependent variable. This is not expected for two reasons: (a) the distribution of money by States is quite directly related to enrollment and thus only remotely associated with placement, (b) placement figures are not as consistently reported on a yearly basis as other variables. This makes the interaction of expenditures with what is expressed as the 'output' very hard to identify. The general impression from the data is that there are relatively few variables which could strongly be related to placement. It is doubtful that even enrollment could be a useful predictor of placement. There is great variance among States on this variable." (Final Report, p. 92)

"There is an implied relationship between *State administrative structure* and outputs in vocational education. The way a board is selected, the way a chief State school officer is selected, the difference between separate vocational boards and State boards with vocational board designation, the role of the State director, each appears to have some effect on enrollment, though the dimensions are not clear. It appears that State directors who are in State boards of education and report through one or more intermediaries have a larger growth at the secondary vocational level that State directors with direct communication with the policy-making body." (Final Report, p. 92)

"*Expenditures* are generally the best predictors, as would be expected since they are directly and purposely related to enrollment. While both enrollments and expenditures increased nationally over the time studied, the internal relationships were more strongly in the inverse direction than in the positive direction." (Final Report, p. 92)

"*Delivery system data* needs considerable attention. These are the most poorly reported data, though an effort was made to incorporate this into the study. All variables studied with the exception of *staff* failed to materialize as useful variables. It is not an easy area to study. The diversity of definitions, between States and the variations which can exist within a State, just in terms of such things as a "board of control" makes it difficult to categorize variables except in a most general way. Other variables such as number of schools serving various levels or categories of students are not clearly enough defined to permit utilization at this time. Even 'area vocational schools' have different definitions between and within States. It could not be used as a variable since even in a general way, a school may be at one or some combination of level (secondary, post-secondary and/or adult). This does not suggest the need for uniformity. Indeed States do have to organize delivery systems in a variety of ways to meet an array of problems. But some in-depth study needs to be undertaken to identify alternative strategies for maximum delivery." (Final Report, pp. 92-93)

"The limited use of state department data presented another problem since there is no uniformity of structure, services or processes. This is related in part to the fact that the expenditure and student data is generally reported in response to federal vocational laws and funding. Many State divisions of vocational education provide services beyond those associated with federal funds." (Final Report, p. 93)

No. 2

Changes in Occupational Characteristics in the Next Decade: Their Implications for Planning in Vocational Education

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Purpose of Project

"To expand the occupational information available to educators by relating job opening data to information about the earnings of persons employed in different occupations, their educational attainment, and the opportunities individual fields are expected to offer for women and nonwhites" (Abstract).

Source of Data

The data base for the study included published and unpublished decennial census data (1970), Current Population Survey Reports, and U.S. Office of Education and other enrollment data.

Findings

The authors present eight major findings which in their analysis appear to be supported by the study data. These findings are cited from the final project report (pages 1-3, 1-4):

> The occupations considered in the study include a somewhat greater proportion of males than females, and a considerably greater percentage of whites than nonwhites. There is a smaller representation of professional and technical workers than in the overall labor force, and a larger proportion of craftsmen and salesworkers. College graduates are conspicuously underrepresented because of the choice of occupational fields. The median earnings of full-year workers in the 123 occupations in 1970 was an eighth less than the comparable earnings for the entired employed civilian labor force.

The overall findings which emerge from the study are summarized below:

1. "About two-thirds of the job openings in the occupations considered in the 1970 to 1985 period are expected to arise from the replacement of attrition losses, and only one third from employment growth. While many of the attrition-generated openings will represent opportunities to replace experienced and skilled workers, the bulk of the replacement demand will occur in less well-paid fields with a majority of female employees."

2. "The vocational education system typically prepares persons for employment in fields which pay less than median earnings for all occupations. In 1970, about two thirds of the full-year workers in the occupation studies earned less than the median for all full-year workers."

3. "If the trends of the past fifteen years continue, the nation's commitment to equal employment opportunity will be accompanied by only modest changes in the occupational distribution for women and somewhat greater changes for nonwhites. As the largest of the publicly-supported occupational training programs, the vocational education system is strategically situated to prepare more women and nonwhites for desirable careers in fields which they have been poorly represented in the past."

4. "The concentration of employment in occupations yielding low incomes is especially marked for women and nonwhites. Three-fourths of the women, and over half of the nonwhite full-year workers in the occupations studied had earnings in 1970 which were approximately $2,000 or more below the national median for full-year workers."

5. "While there will be many more college graduates in 1985 than at present, the more widespread changes are expected to stem from the sharp decline in the proportion of employed persons with less than 12 years of schooling. The reduction in the representation of 'dropouts' is projected to be greatest in the less skilled occupations in which they have been traditionally been concentrated."

6. "Although the vocational education system has become more labor-market oriented in its planning there are still significant divergences between the job openings and vocational enrollments anticipated in the next decade. There is a far larger proportion of enrollments than job openings in the agricultural field, and a considerably lesser proportion of enrollments than jobs in the health and distribution fields."

7. "Demographic changes in the next decade can be expected to lessen the importance of the high school age group as the primary audience for vocational programs, and to increase the importance of adults with labor force experience as the source of enrollment growth. As one indication of the dimensions of this demographic shift, the population of 13- to 24-year-olds is projected to decline by 3.2 million between 1980 and 1985."

8. "It is feasible to prepare most of the occupational characteristics indicators presented nationally for individual states or the larger Standard Metropolitan Statistical Areas. However, because of the smaller population base and sample size, considerations of statistical reliability limit the degree of detail which can be provided in these estimates."

The occupations individuals choose have a major bearing on their income, their likelihood of becoming unemployed, and their opportunities for self-realization. Occupational choices, in turn, can influence the economy's growth by contributing to the development of manpower surpluses which add to unemployment or to manpower bottlenecks which raise employers' costs. The information provided to students about the occupations or used in educational planning must encompass the range of considerations which are relevant in making occupational choices. The information presented in this study can provide a first step in developing and improving a series of occupational characteristics indicators to supply a more comprehensive overview of anticipated changes influencing the transition from school to work. Final Report, pages 1-3 and 1-4)

No. 3

Illinois*

*Data not available when report was written.

No. 4

A Research Project in Developing a System for Comprehensive Vocational Planning for Local Schools in Kansas

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Purpose of Project

The purpose of this study was to research a more comprehensive state-local planning unit that would consider local needs for curriculum development, work-experience programs, effective programs for the disadvantaged/handicapped and that would couple its activities with proper guidance, counseling, placement and follow-up services (Final Report, Abstract, page ii). Specifically the project was designed to do the following:

1. "To formulate a Regional Consortium Committee from Southeast Kansas and appoint Regional Planning and Management Coordinators, and to begin a regional assessment of manpower needs, vocational programming, and placement in the following educational areas in Southeast Kansas:

   a. pre-vocational programs
   b. secondary vocational programs
   c. post-secondary vocational programs
   d. adult vocational programs
   e. programs serving disadvantaged and handicapped as well as minorities." (Final Report, page 10)

2. "To establish an Information Unit that would provide a review of existing systems already developed in Kansas, to provide information for management by objectives, and to provide for the establishment of needs for further research." (Final Report, page 11)

Source of Data

Information was collected by the project staff who worked with local school districts in a nine-county region of Southeast Kansas (Allen, Bourbon, Cherokee, Crawford, Labette, Montgomery, Newho, Wilson, and Wordson counties).

Findings

"Findings revealed that practically all educators in the nine-county area from the State Department level to the classroom level were involved in the project in one way or another. And since all of the manufacturing services were contacted, employers in the area were aware of the educational services as well. In many instances these industrial leaders became actively involved in the project and a stronger community interest in education resulted.

"Findings also revealed that as a result of cooperative planning the number of proposals for innovative projects generating from the local level increased and it was discovered that the local schools were more willing to assume financial responsibility for these programs once State and Federal funds were exhausted. Cooperative planning also allowed for graduate student research to be directed towards more nearly meeting the educational needs of the area.

"The need for in-service training pinpointed the fact that criteria for quality control must be carefully established for both pre-service and in-service education.

"The findings also demonstrated the role career education can play in developing all aspects of education.

"As a result of this study, school districts within this nine-county area elected to continue the concept of regionalization. And, at the State level, it was decided to include in the 1977 Plan provisions for personnel development, evaluation procedures, total utilization of State resources, and a systematic plan for state-wide research. Also included in the 1977 Plan were job descriptions for additional State staff to aid in carrying out these additional planning and research activities." (Final Report, pages iii and iv)

This project was also partially responsible for the enactment of House Bill No. 2381, which enabled schools to cooperate for educational services in Kansas.

No. 5

A Study of Job Demands and Curriculum Development in Agricultural Training Related to the Muskegon County Wastewater Management System

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Muskegon Area Independent School District
Muskegon, Michigan 49442

Purpose of Project

To identify job needs for agricultural occupations which will result from the Muskegon County Wastewater Management Systems and perform a task analysis on each occupation; to develop instructional modules and determine their place in either high school or two year college programs; and implement an anticipated curriculum with actual programs and gain approval for funding.

Source of Data

Project personnel involved many local and state personnel as advisors to assist in the identification of job needs and task analyses.

Findings

The employment of individuals for wastewater treatment systems is expected to increase in the 1980's. Based on the study in Muskegon, Michigan, there is a need for more specialized vocational and technical agricultural programs at the secondary and post-secondary levels. Even though the number of American farms is decreasing with the size of farms tending to increase, there will continue to be a need for farm related occupations (e.g., grain drier operator). (pages 10-12 of report)

The project made a local study of job needs, translated these needs into task analyses for curriculum development, designed instructional modules and studied the placement of these courses into an overall educational system.

The staff developed a 90 frame filmstrip and cassette tape series entitled "Careers in Agriculture." The series was designed for audience at approximately the 6th grade level.

No. 6

Choctaw Manpower and Demographic Survey 1974 (March 1974)

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Purpose of Project

The basic purpose of the survey was: to make available basic manpower, labor force, and demographic data on the Choctaw population, including the size and composition of the Choctaw population, the size and location of the Choctaw labor force by community, labor force composition by age and sex, and other relevant characteristics, such as patterns of geographical mobility, educational level, prior work experience, skill level, current employment status, and language barriers.

Source of Data

"The 1974 survey elicited information about both households and individuals, thus providing demographic, household and manpower data regarding all Choctaws living in or near the seven Mississippi Choctaw communities which comprise the reservation service area in East Central Mississippi. Persons living off tribal land in nearby rural areas and towns were included as members of the Choctaw Communities." (Final Report, pp. 1-2)

Findings

The 1974 Manpower Survey . . . found a total of 2,118 persons, 742 males and 739 females, in the Choctaw Labor Force. At the time of the survey (1974) 65 percent were gainfully employed, 8 percent were enrolled in work experience training programs, and 27 percent were unemployed but available for work. (Final Report, p. 29)

The Choctaw Manpower and Demographic Survey is a snapshot of the Mississippi Band of Choctaw Indians. Information in the survey (e.g., 29 percent unemployed but available for work) could be used by vocational educators, and employers for employment and educational program planning-related activities.

No. 7

A "Hands-On" Information System for Vocational Education Planning (March 1976)

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Purpose of Project

To bring the current state of the art of projecting employment levels and composition to the attention of administrators of vocational-technical education programs; to describe the data requirements for accomplishing specific types of projections to document the development of an information system; and to host a national conference in July 1975 to disseminate the results of research activity.

Source of Data

Federal, state and local agency reports on projecting employment.

Findings

The project findings are reported in the publication *Employment Projections for Planning Vocational Technical Education Curricula: Mission Impossible* (January 1976) and the companion conference report, *Occupational Employment Projections for Program Planning Purposes: Issues and Examples* (January 1976), both authored by David W. Stevens.

The two project reports (Employment Projections and Conference Proceedings) make a contribution to the literature on manpower information systems. The volume on *Employment Projections for Planning Vocational-Technical Curricula: Mission Impossible* provides the reader an overview of employment and related concepts. Terms are defined, models for projecting employment are described, and a discussion of labor market concepts is presented. The Conference Report contains information from leaders in the field of employment projections and forecasting.

No. 8

Nebraska*

*Data not available when report was written.

No. 9

Comprehensive Instructional Management System for Occupational Education in New York State

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Purpose of Project

To design and demonstrate the effectiveness of an Instructional Support System (ISS) for Occupational Education. To determine the empirical or institutional feasibility of implementing the Targeting Subsystem. Both systems were designed to improve vocational education and produce products that are designed to improve and extend existing vocational education practices. (Project Abstract)

Source of Data

The data for the study was gathered in-state from teacher training workshops, curriculum development activities and pilot testing of modularized curriculum packages. (p. 1)

Findings

The model for teacher-generated, common format, modularized curriculum in occupational education was found to be workable, requiring some modifications. Teachers were trained and curriculum packages were developed and "critique tested" on schedule. (page 32) Problems were encountered in the installation and utilization of the computer retrieval system. It was felt that these problems could be eliminated by providing teachers more time for training and use of the supporting information bases. (page 32)

No. 10

Data Needs in Vocational Education "The Development of a Minimal Information System to Satisfy the Need of Selected User Groups" (Project ED NEED)

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Purpose of Project

EDNEED I was conceived as an important first step toward the development of a basic information system for vocational education. The project had three purposes: (1) to determine, empirically, the extent to which selected data questions represent the vocational education informational needs of users at the national, state and local levels; (2) to prioritize the data questions according to their degree of relative importance across levels and within levels by use category (planning, operation, evaluation finance and budgeting, reporting requirements, public information); and (3) to determine similarities in information needs across levels and use categories. (Final Report, page iii)

Source of Data

Data was gathered from persons representing national, state and local vocational education and related organizations (e.g., Employment and Training Administration/DOL). These individuals were asked to identify, review and prioritize data needs for vocational education.

Findings

Although summarized in detail in Volume I, the results of the project are reported in Volumes IV and V: Volume IV–Issues and Recommendations Reports of the EDNEED Conferences, Volume V–Data Analysis: Procedures and Results. (Final Report, pages ix-xi)

Highlights of the project findings are (Final Report–Summary, pages ix-xi):

- A national system for vocational education data collection with emphasis on uniformity of data and format is critically needed.
- Standardized national definitions for data elements must be of the highest priority.
- A national data system will require federal funding and support.
- "Change" must be incorporated as a characteristic for any vocational education data systems. Additions and deletions of data will be constant.

- The extent to which data will be used, by whom, and for what purpose must be established early, as well as the locus of control and physical location of the system.

- There appears to be little coordination among existing data systems, or among data producers and data users.

- Consideration must be given to the already heavy "data burden" on state and local education agencies. Statistically sound sampling is an alternative worth exploring in this regard.

- State vocational education agencies are both data producers and data users. The data burden problem falls most heavily on their shoulders and they appear reluctant to become involved in activities which might increase the burden.

- A definitive study of data sources now in place is crucial. Any national data system should be designed to use every available data source. Only data which are highly needed but not currently available should be added.

- A national data system should provide a means for ensuring that data aggregated upward from local education agencies could be directed back to them in a timely and meaningful way. Local administrators indicated that this is often not the case at present, even with their own states MIS's.

- Vocational educators must learn to measure fitness for employment of graduates and early leavers in terms of their acquired and demonstrable competencies rather than in terms of courses taken and hours spent in classrooms, labs and shops. Such measurement data in a system could provide a basis for accurate studies of the costs of instruction vs. the benefits of placing people in employment.

- Local education agency data users have a greater need for curriculum information than either national or state users.

- State users have less need for data on student characteristics than either national or local users.

- Local data needs are more congruent with a national orientation than a state orientation.

- State data needs are more congruent with a national orientation than a local orientation.

- National data needs are more congruent with a local orientation than a state orientation.

- Information on the characteristics of the curriculum and instructional processes was the most important category of information need across all levels and uses.

- Information concerning the characteristics of vocational program completers and early leavers was the most important category of informational need over all uses at the national level.

- Information on the characteristics of the curriculum and instructional processes was the most important category for both local and state users over all uses.

- There is a distinct demand at all levels for data descriptive of vocational education at the "grass roots." At all levels, users are most interested in knowing who is being served, what they are being served, and what happens as a result of their being served.

- National data needs for planning, evaluation, reporting requirements and public information are distinct from national needs for operations and finance/budgeting data.

- State data needs for planning, operations, finance/budgeting and reporting requirements differ from national needs for evaluation and public information.

- Local needs for data appear to be relatively consistent across all uses.

- The EDNEED project involved vocational education and other personnel at the federal, state and local levels to identify, rate and review data needs in vocational education. Five volumes were generated by the project which describe findings, procedures, classifications, and conference inputs.

No. 11

The Comparative Efficacy of Selected Manpower Demand Projection Techniques on Diversified Populations (January 1976)

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Purpose of Project

The objective of the project was to compare a Modified Survey (MASS) with a Modified Industry/Occupation Matrix (MIOM) method or projecting manpower demand. (p. 1)

Source of Data

Comparison data were obtained locally to estimate future employment for a specified number of occupations in selected counties. The methods (MASS and MIOM) were then used to forecast employment needs. The project utilized Oklahoma data for the comparisons.

Findings

Neither the MASS or MIOM methods were considered, by the Project Director, to be a very good method for projecting manpower demands; however, MIOM was less costly.

Manpower information system designers and users need data comparing projection methods. This project was able to produce a comparison between two methods used to forecast manpower demand.

No. 12

Task Inventory Exchange (TIE)

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Purpose of Project

Many diverse agencies, organizations, institutions, businesses, industries, and people are creating and/or using task inventories. Until the advent of the Task Inventory Exchange (TIE) project, there existed no centralized and comprehensive system to make these people and organizations aware of existent task inventories. Nor was there a system for sharing of task inventories by making copies of them available. This project was designed to:

1. Make people aware of task inventories and related information, and
2. Provide copies of task inventories, thus promoting utilization.

Source of Data

The Task Inventory Exchange (TIE) was to become the central repository and clearinghouse for task inventories. Nine activities of the Task Inventory Exchange project were to:

1. Promote the utility of field contributions of task inventories to the Task Inventory Exchange by extensive announcement (publicity) of TIE, and by publication and distribution of an initial (Volume I) *Directory of Task Inventories.*
2. Actively search for and identify task inventories.
3. Acquire a copy of each available inventory, and related information, and permission of the originator to reproduce and distribute copies through TIE.
4. Catalog, microfilm, and store these inventories in a central location.
5. Describe the key characteristics of each inventory.
6. Compile and publish a second edition of the *Directory* noting what inventories exist, their characteristics and where copies may be obtained.
7. Compile and synthesize the empirical research findings that have been published on the development and use of task inventories.
8. Respond to requests for information about the development and use of task inventories.
9. Respond to requests for copies of task inventories which are centrally stored, microfilmed and released for duplication, on a cost-recovery basis.

These activities were believed to be the most efficient and effective means of promoting the sharing and use of task inventories, and making copies of those inventories available to persons interested in them through a centralized and easily accessible service.

Findings

The TIE Project provided information to persons requesting task analyses on selected occupations. Over 358 requests were processed during the first 12 months operation of the project.

Task inventories may be used to identify critical job activities. The use of task inventories might support the validation of employment tests, in compliance with uniform employment test guidelines being established by the federal Equal Employment Opportunity Coordination Council (EEOCC). Task inventories are also becoming highly useful in the rigorous and systematic specification of behavioral objectives and criterion-referenced tests used in general instructional programs as well as performance-based training.

No. 13

Manpower Information Research Training Project

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Purpose of Project

The basic objective of this program was to upgrade the competencies of vocational/technical education program personnel based on manpower research in the planning of vocational education programs.

Source of Data

The program was organized and conducted as a presession to the AVA convention held in New Orleans, Louisiana, December 4, 5, and 6, 1974. A total of 36 individuals from state departments of education and universities participated in the presession.

Findings

The training seminar project was helpful to the participants who were responsible for planning vocational education programs at the state and university levels.

No. 14

A Statewide Manpower/Curriculum Management System (March 1976)

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Purpose of Project

The primary purposes of the project were to strengthen and expand applied research efforts in the areas of manpower analysis, counseling and guidance and curriculum development. The broad goals of the project were to:

1. Provide for the development, refinement and use of manpower data for program planners, curriculum development, and guidance and counseling;

2. Create a data base through occupational task/competency/instructional analysis for purposes of program planning, curriculum development and guidance; and

3. Provide models for utilization of data in curriculum development with emphasis on individualized instruction, work experience and students assessment.

Source of Data

Project personnel identified and gathered a detailed manpower information regarding employment in Oregon. This included a detailed listing of occupations corresponding to the career clusters, related estimates of employment and job opening* and supply of graduates from training programs** available to fill the openings. From the above effort, Oregon can now identify occupational needs for some 2,800 occupations in 18 career clusters.

Curriculum materials were also reviewed and developed using the CPPS. These included tasks, competency and instructional analyses which are presently being used to revise the career cluster curriculum guides. Curriculum materials resulting from ERIC searches were used as appropriate.

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*The Oregon Employment Division was the primary supplier of the employment estimates.

**The supply of graduates was obtained from the Oregon Educational Coordinating Commission and Oregon Department of Education.

Findings

A major outcome of the project has been the development of the Career Program Planning System (CPPS), a computerized manpower retrieval system, which is able to provide annual updates of manpower demand and supply estimates for each of the career clusters.

The project was also instrumental in enhancing the development of an occupational base for curriculum development in Oregon. Through the project, the staff was able to compile and develop numerous occupational tasks analyses, occupational competencies and learner modules which otherwise would have taken a longer time to develop.

No. 15

Management Information System

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Purpose of Project

The overall goal of the MIS was to provide occupational education administrators at all levels, the information on which to base the planning of more effective programs and services. Data gathered on a continuous basis at the different subsystems is expected to aid in the best utilization of vocational economic resources, resulting in a well-planned program responsive to the island occupational demands and needs and to the increased pressures for accountability.

Source of Data

Project data was gathered from vocational education, manpower training and related sources on the island of Puerto Rico.

Findings

Data was collected on occupational supply and demand of the island. This information was made available to vocational education planners in various publications including:

1. *Manpower Training Reports*
2. *Manpower Training Needs*
3. *Labor Area Summary Monthly Reports*

No. 16

Vocational Management Information Interface Study
(April 1976)

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Purpose of Project

To provide technical and support services, at both the SDE and LEA levels, directed toward the development, implementation and evaluation of an automated system for collecting and report ing vocational data. (Abstract of Final Report)

Source of Data

Existing data for South Carolina found in a manual reporting system.

Findings

The availability of current data for decision making has had a positive influence on vocational managers. They are better able to identify needs, establish priorities, assess progress toward goals, and increase the awareness, understanding and commitment of local school administrators toward vocational education. (p. 26)

The project accomplished the linkage of an automated data managed system to an occupa tional information system within South Carolina. The South Carolina study was basically the con version of data. After the data had been converted it was merged with an information system.

No. 17

Development and Implementation of a Model Regional Information System for Vocational Technical Education (January 1976)

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The University of Tennessee
College of Education
Knoxville, Tennessee

Purpose of Project

To develop a model regional information system, test the system and determine the feasibility of regional systems for sharing information across geographic and political boundaries.

Source of Data

The regional system was designed for use in eight Tennessee counties, seven North Carolina counties and three Virginia counties. County and regional enrollment data, teacher salaries, average daily attendance, value of school property, populations trends, migration rates, estimates of county populations, employment and unemployment related information were collected for the various counties and regions. The project report provides a complete listing of data sources by county or groups of counties.

Findings

The Regional Information System appears to be transportable. Other regions of the country could gather similar information for vocational decision making. Information on demand and supply in the regions of the three states was helpful to planners of vocational technical education programs. It was determined that in-service education for Regional Information System users would be very helpful in developing, evaluating and maintaining the system.

The three-state, eighteen county regional information system project could be used in another area. The system gathers data that is generally common throughout the nation from a variety of local, state and federal sources.

No. 18

Texas*

*Data not available when report was written.

No. 19

An Employment Agency Model for Providing Job Information to Rural Disadvantaged Populations

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Purpose of Project

The project purpose was to study the availability to public and private employment agencies to meet job placement and educational needs of rural Texas residents. The study involved identify ing agencies (both public and private), determining types of services offered, surveying potential users of employment services, identifying rate of participation served by agencies and review factors that prevent people from entering employment areas.

Source of Data

Information sources were public and private employment agencies in three rural Texas coun ties, vocational education graduates, and local employers. Information was limited by number of agencies in the rural area, and responses to questionnaires sent to samples of employers and gradu ates.

Findings

Employment agencies were not used because job applicants have "to wait too long for results, located too far from their homes, and too many forms to fill out." "Job opportunities are greater for those persons willing to relocate for employment . . ." (Final Report, p. 3)

No. 20

FORECASTING MODEL
Statewide Manpower Projections for Vocational Education

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Purpose of Project

The major purpose of this project was to assist local schools in the identification and use of forecast data and to aid them in interfacing with state agencies in their planning for vocational education programs.

The original intent of the project was to provide this assistance to community colleges; to secondary schools and to vocational-technical institutes. However, due to administrative and operational management commitments and differences in philosophy at this time between state and local level administration the Superintendent of Public Instruction staff declined to participate. The USOE was then requested and gave approval to limit the project to community colleges only.

Source of Data

Project data was collected from personnel at selected community colleges in Washington. The project was accomplished through a series of mini-projects involving about 50 percent of the community colleges in the state.

Findings

As a result of the project, the following activities were accomplished.

1. An assessment was made of the management and decision making system for the enrollment, planning and budgeting processes in one college; a conceptual improved design was developed and then applied.
2. A plan and schedule was developed for "reviewing the capital analysis model"—a model which produces future space needs for various programs in community colleges.
3. Assessments of need for supplemental vocational training were made in eight community colleges.
4. A study involving five community colleges was made to determine the "recession related enrollment patterns."
5. The program and enrollment plans in each community college were reviewed and revised consistent with the forecast information.
6. Computerized "enrollment allocation model" was developed, into which various constraints and conditions may be fed to test the outcome of various decisions.

Relationship of Projects to the Review Framework

This section of the report discusses the projects in relation to the review framework presented in Figure 1 on page ; Occupational Information – A; Supply – B; Educational and Training – C; and Demand – D, level of project emphasis, methodology and project conclusions.

Occupational Information – A. Six of the projects reviewed emphasized the occupational information element. Rawson (No. 4)* reports career and vocational information being provided to school districts in nine southeastern Kansas counties. Fisher and others (No. 5) used task inventories for curriculum development to serve individuals who might be interested in pursuing agribusiness, national resources and environmental careers at the secondary and post secondary levels. Seckendorf (No. 9) trained teachers to develop modularized curriculum packages for occupational education in New York. Porter (No. 10) reports the collection of data about the manpower information needs of administrators and practitioners working in vocational education; information was rated by a national sample of these groups as to its importance for their performance. Schroeder (No. 12) collected and shared task inventories for instruction related purposes; the exchange capability of the project is being continued by The Center for Vocational Education. Bice and Smith (No. 17) collected and reported existing occupational information in regions of three states, now available in several publications.

The Schroeder and Porter projects would be helpful to program planners and curriculum developers throughout the nation. The regional information project in Tennessee reported by Bice and Smith could serve as a model for regional information systems that go beyond state boundaries. Rawson, Fisher et al. and Seckendorf projects primarily served local or state needs.

Supply – B. Ten projects reported work on the supply element. Lecht and others (No. 2) at the Conference Board studied the projected supply and demand for individuals in 123 selected occupations. Spencer and others (No. 6) at Mississippi reported the demographic data for Choctaw Indians which included the number of individuals in various age groups who are available for employment, most of whom needed additional training for employment. Stevens (No. 7) reported the "state-of-the-art" in predicting supply and demand for employment. The North Carolina project reported by Porter (No. 10) dealt with supply and related topics in a survey of vocational education personnel. Morton (No. 11) located at Oklahoma studied two manpower projection techniques that included both supply and demand. An Ohio project reported by Vivian (No. 13) included supply as one of the topics of discussion in a seminar for vocational educators. Velez (No. 15) compiled data about Puerto Rico students in training. Lashway and Miller (No. 16) use the automated data system for reporting supply. In addition to occupational data, Bice and Smith (No. 17) collected information about supply from secondary sources in regions of three states. Bonner (No. 19) reported on both supply and demand of students for vocational education to fill jobs in a three county area. Wimer (No. 20) reported the "recession related enrollment patterns" of five community colleges in Washington state.

Lecht and others projections for 123 occupations, Stevens' state-of-the-art report, Porter's study and Tennessee regional project reported by Bice and Smith have nationwide implications. The Vivian and Serros reports had local and state orientations.

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*All references are to projects summarized in Table 1.

Education and Training–C. Seven projects were concerned with education and training related activities. These activities included curriculum development, instruction and task inventories. Whinfield (No. 1) emphasized strengthening and development of vocational education via state manpower information systems. Rawson (No. 4) directly assisted local schools in nine counties in the development of career and vocational activities. Fisher and others (No. 5) reported the education and training needs for agribusiness, natural resources, and environmental protection in the Muskegon County area. Seckendorf (No. 9) reported the use of teachers to develop modularized occupational education curriculum packages. Schroeder (No. 12) operated the Task Inventory Exchange (TIE) which was a helpful resource to instructors and curriculum developers. Vivian (No. 13) reported on a manpower seminar for state leaders. Gilles (No. 14) developed a statewide curriculum management system that included 38 task analyses, work experience training plans and curriculum development procedures. Bice and Smith (No. 17) emphasized the use of available and existing data in a three-state area for program planning and curriculum development in vocational education.

The Task Inventory Exchange (Schroeder), the Oregon (Gilles) curriculum management project, the Seckendorf project and the Tennessee (Bice and Smith) regional project have national implications for service or could serve as state or regional prototypes. The Connecticut project reported by Whinfield, while dealing with state systems, makes extensive use of Project *Baseline* data. The Kansas (Rawson) and Michigan (Fisher and others) were locally focused projects.

Demand–D. The demand for skilled persons to fill existing or projected job vacancies was of interest in 11 of the projects. Lecht and others (No. 2) at the Conference Board examined nationwide supply and demand for 123 selected occupations; it was predicted that the greatest demand for employment in the next decade in these selected occupations would be for women and nonwhites. Fisher and others (No. 5) studied the need (demand) for persons in agribusiness, natural resources and environmental protection in Muskegon County; task analyses, curriculum development and placement of programs at the secondary and post-secondary levels were studied. Stevens (No. 7) reported the state-of-the-art on projecting employment supply and demand; findings indicated that practitioners need a better understanding of basic terminology and the limitations of existing projection techniques. Porter (No. 10) was concerned with the need for information about both supply and demand by vocational education administrators and practitioners. Morton (No. 11) compared the benefits of two manpower projection techniques; both of these techniques include data on supply and demand. Vivian (No. 13) conducted a seminar for vocational education administrators on manpower information systems; the seminar emphasis was on both supply and demand elements. Gilles (No. 14) used priority occupational areas, identified in other projects for the development of a statewide curriculum management system. Velez (No. 15) in the Puerto Rico projects reported on the demand element; however, the emphasis for Phase I was on obtaining student data. Bice and Smith (No. 17) reported information at the county level on all the review framework variables including demand. Bonner (No. 19) reports demand information for vocational education graduates in three counties. Wimer (No. 20) reported on demand in terms of enrollment, facilities and planning vocational education programs in Washington state. The Washington mini-projects were funded at the community college level.

Most of the projects dealt with the demand (D) element. National emphasis was the focus of three projects (Nos. 2, 10, and 12). Bice and Smith (No. 17) reported on regionalized data; other projects were focused at the state level (No. 7, 11, 13, 14, 15, and 20). Local needs was the subject of the Fisher and others (No. 5) and Bonner (No. 19) reports.

User's Index to Projects

Reviewers suggested the development of a table or index for users to identify projects and people who could be helpful in providing information on aspects of manpower information systems. The following list identifies projects by activities such as curriculum development, data gathering techniques and specific populations. Projects may be listed under more than one category. Not all projects are listed. Numbers in ( ) after names and states refer to project identification number corresponding to those in Tables 1 and 2 and project descriptions.

Curriculum Development

Seckendorf, New York (9)
Fisher and others, Michigan (5)
Gilles, Oregon (14)

Curriculum Management

Gilles, Oregon (14)

Disadvantaged Populations

Bonner, Texas (19)–Rural
Spencer and others, Mississippi (6)–Indians

Task Inventories

Schroeder, Ohio (12)
Gilles, Oregon (14)
Fisher and others, Michigan (5)

Computer Systems

Lashway and Miller, South Carolina (16)

Terminology

Stevens, Missouri (7)

Manpower Projections

Lecht and others, New York (2)
Wimer, Washington (20)

Comparing Projection Methods

Morton, Oklahoma (11)

Regional Information Systems

Bice and Smith, Tennessee (17), 3 states
Rawson, Kansas (4), 9 counties

Synthesis

The synthesis of information from these reports is organized around three themes: (1) target audiences (e.g., administrators, curriculum developers, planners); (2) methodologies used; and (3) project conclusions.

Target Audiences

Many of the FY74 MIS projects have utility for vocational education administrators. Rawson (No. 4) was concerned with vocational and career education programs in nine southeastern county school districts. Spencer et al., (No. 6) provided demographic data on the Choctaw Indians that could be used in planning educational and employment training programs for them. Porter (No. 10) reported information needed by vocational educators for decision making and manpower

planning at local, state and national levels. Vivian (No. 13) reported a training experience for vocational education administrators. Velez (No. 15) was concerned with a system for gathering data for vocational education reports. Lashway and Miller (No. 16) reported converting a manual system to an automated system for data gathering and reporting. Bonner (No. 19) described a study of employment agencies and services offered to vocational education graduates and others in three counties. Wimer (No. 20) conducted mini-project studies at selected community colleges.

Curriculum developers will be able to utilize information from several projects. Fisher et al., (No. 5) utilized task analyses, occupational projections, curriculum development and planning in their study of manpower needs for occupations related to wastewater treatment in Muskegon County. Schroeder (No. 12) operated a Task Inventory Exchange which proved useful to curriculum developers. Gilles (No. 14) reported the development of a management system for curriculum which focused on occupations identified within the state. Bice and Smith (No. 17) used existing information for program planning and curriculum development in a three-state area which has utility for multi-state regions of the country.

Planners interested in manpower projections would benefit from study and review of several project reports. Whinfield (No. 1) reports on state systems for manpower reporting. Lecht and others (No. 2) at the Conference Board were concerned with the employment projections of 123 selected occupations throughout the nation. Stevens (No. 7) provided a "state-of-the-art" report on manpower projection procedures. Morton (No. 11) compared the cost effectiveness of two manpower projection techniques.

Methodology

It was common for projects to use existing information or data. For example, Whinfield (No. 1) reviewed Project Baseline data on state administration of vocational education supplemented by data collected in a survey. Lecht and others (No. 2) projected manpower supply and demand for 123 selected occupations from data obtained from secondary sources (e.g., Census, Bureau of Labor Statistics, etc.). Bice and Smith (No. 17) also used secondary sources to assemble data on supply, demand, and occupational information that could be used for planning education and training in an 18 county, three state area. Rawson (No. 4) assembled information and materials for use in in service training in nine southeastern Kansas counties. Schroeder's TIE project (No. 12) collected task inventories and developed a system to make them available.

Survey data was collected and reported by four of the MIS projects. For example, Spencer and others (No. 5) collected basic demographic data about the Choctaw Indians in Mississippi. Porter (No. 10) collected data from vocational educators regarding their information needs for decision making which was summarized, and ranked by importance. Bonner (No. 19) surveyed agencies in a three county region to determine the type of employment services offered vocational education graduates. Wimer (No. 20) conducted six mini projects at selected community colleges which contributed data to a manpower forecasting model for the state of Washington.

Curriculum development, task analyses, advisory committees and programming were used in the Fisher et al., and Gilles projects. Fisher et al., used advisory committees, task analyses, curriculum development and planning to identify training needs for wastewater treatment occupations. Gilles developed a statewide curriculum management system which used manpower data, task analyses, curriculum development and competencies for vocational education programs.

Five states used selected methodologies for their project activities. For example, Stevens (No. 7) provided a state of the art report for manpower projections based on a review of literature and the experience of the project director. Vivian (No. 13) provided in-service training for vocational education administrators in several states. Lashway and Miller (No. 16) converted their vocational education reporting system from a manual to computer system. Velez (No. 15) developed a student data base for vocational education reporting purposes. Morton (No. 11) conducted a cost analysis of two manpower projection techniques.

Project Conclusions

Conclusions extracted from the final report reports are provided in this section of the report. Whinfield (1) specified the need for clearer definitions by states of what their data represents; (2) description of "delivery systems" rationale and attributes; (3) better use of existing data; and (4) more attention to placement.

Lecht and others (No. 2) studied 123 occupations which are expected to generate over a million jobs annually between 1970-1985. Many of these new jobs are expected to be filled by women and non whites.

Rawson (No. 4) reported success in organizing the nine-county project in Kansas, the cooperation of all persons involved and the continuation of the project after initial investment of funds.

Fisher et al. (No. 5) identifies the need for training people to fill jobs in agribusiness, national resources and environmental protection. The project provided task analysis and curriculum for this proposed training.

Spencer et al. (No. 6) concluded that if Choctaw Indians are to advance into jobs where skill requirements and job market demand (and thus recommendation and job security) are higher, it will be necessary to acquire higher levels of work skills and education (page 29 of the Final Report).

Stevens (No. 7) concluded that the state-of-the-art of manpower information systems (employment demand projections, etc.) needs some basic maintenance and new efforts to explain basic differences in terminology and the use of data gathered by MIS (extracted from pages 38 39 of the Final Report).

Seckendorf (No. 9) concludes that the system for teacher developed modularized curriculum materials is a viable approach for the state of New York.

Porter (No. 10) listed many recommendations and conclusions that relate to the need for a national vocational education data system; determining the use of data prior to collection; assessing student competencies; curriculum development; gathering data about "early leavers" and completers of vocational education; processing curriculum and instruction; and differences in data needs by levels (e.g., federal, state, local).

Using two methods for projecting manpower demand, Morton (No. 11) found that both techniques (MIOM-Modified Industry/Occupation Matrix and MASS-Modified Area Skill Survey) are useful but the MIOM was less costly for selected Oklahoma counties.

Schroeder (No. 12) reported the TIE project to be a useful concept for sharing information on jobs/occupations that could be used for developing curriculum.

Vivian (No. 13) reported that seminar participants were satisfied with their experience in discussing manpower information systems at the AVE Presession.

Gilles (No. 14) concluded that there is a need to periodically update (2-3 year intervals) manpower systems. The supply component of manpower systems needs the most attention. Supply sources should be identified and accurate information obtained.

Velez (No. 15) concluded that the development of a student data file was the most important task in developing their manpower information system.

Lashway and Miller (No. 16) converted from a manual to an automated vocational data collection/reporting system which provided for timely delivery of relevant reporting information. Using the automated system has allowed for estimating 90 percent of the need for data by the Office of Vocational Education. Also the quality of vocational education reporting has improved for South Carolina (taken from page 26 of the Final Report).

Bice and Smith (No. 17) reporting on the Tennessee regional project concluded that there is a benefit to using existing data for vocational-technical education program planning. For people to use the regional system it is recommended that some in-service training take place (extracted from page 38 of the Final Report).

Bonner (No. 19) reported that employment agencies were not used because job applicants had ". . . to wait too long for results, located too far from their homes and too many forms to fill out. Job opportunities are greater for those persons willing to relocate for employment . . ."

Wimer (No. 20) concluded that state planning is primarily a reaction to state/national demands and tends to be formal. Local planning is more informal. "Local planners at Community Colleges in Washington are not well informed on how the planning process works about their level." (page 3 of Final Report).

Recent Developments in Manpower Information and Systems

The FY74 MIS projects are part of the continuing efforts of the U.S. Office of Education to capacitate states in their vocational education planning. Several events have taken place since the funding and reporting of FY74 project activities that will have an effect on manpower information and systems.

First, the U.S. Office of Education funded an additional group of project activities in FY75. According to Wilson (1975) 23 awards were made in FY75: ". . . 17 of the 23 awards (74 percent) went to State Education Agencies (SEA's) which five (5) awards (22 percent) went to Colleges and Universities and one (1) award (4 percent) went to a non profit institution." Five of the 23 awards were continuations of activities begun in FY74. The significant and continuing support of state MIS projects is a commendable action taken by the U.S. Office of Education's Division of Research and Demonstration located within the Bureau of Occupational and Adult Education.

Second, in August 1976 a significant agreement was signed between the Department of Labor and the U.S. Office of Education. This "interagency agreement" was for communication, cooperation and coordination of activities between the agencies in regard to manpower information and systems. The agreement provides for joint efforts in the study, design and evaluation of manpower information systems.

Third, the U.S. Congress passed the Education Amendments of 1976 (P.L. 94-482). The amendments stress the need for continuing the support of activities and projects at national, state and local levels to develop comprehensive manpower information systems. These systems should provide data to decision makers for the development of education and training programs. During 1977 the rules and regulations for the Education Amendments of 1976 will be developed by USOE on the procedures and priorities for manpower information systems inputs into vocational education planning.

The Amendments (P.L. 94-482) also provide for the establishment of a National Occupational Information Coordinating Committee to improve coordination between manpower data reporting agencies at the national level, develop and implement an occupational information system by September 30, 1977, and to visit state occupational information coordinating committees.

Other Manpower Information Systems Reports

In addition to the MIS projects supported by the U.S. Office of Education in FY74, there were other related projects underway. Each of these projects will be briefly described and their relationships to the review framework will be discussed. Reports describing these projects are cited in the bibliography of this report.

Information System for Vocational Education (ISVD)

The ISVD project sponsored by the USOE, under the leadership of Tiedeman and others at Harvard University, was designed to provide occupational facts and/or data which can be converted into vocational information. The system makes extensive use of computers to display information for youth and adults (kindergarten through retirement) to be used in making personal decisions about occupations. ISVD appears to emphasize the review framework elements of information (A), and education and training (C).

Occupational Training Information System (OTIS)

The OTIS System, sponsored by the Oklahoma State Department of Education, was reported by Braden and others. This system examined supply, demand, and related information (e.g., cost analysis, human resources, and sociopolitical involvements) to show net demand and manpower requirements in Oklahoma.

OTIS emphasizes the supply (B) and demand (D) elements of the review framework. This data has been used within Oklahoma to support the State Plan for Vocational Education.

Vocational Information for Education and Work (VIEW)

The VIEW system provides current information to aid students in occupational decision making. National, state or local data can be prepared about occupations and placed on microfilm aperature cards. The cards are distributed to local schools for student use. There are problems in keeping the data current for an up-to date picture of an occupational area.

VIEW emphasizes the information (A), education and training (C), and demand (D) elements of the review framework.

Information Needed for Occupational Entry (INFOE)

Project INFOE was developed in Tennessee and reported by Cameron. INFOE incorporates the use of microfilm aperature cards (RE: VIEW) to provide information about local employment opportunities. Project INFOE emphasizes the information (A) and education and training (C) and demand (D) elements of the review framework.

Vocational Education Management Information System (VEMIS)

The VEMIS procedure, reported by Goldberg in Pennsylvania, was designed to facilitate reporting to the U.S. Office of Education. The system processes data/information on labor market needs (demand), vocational program standards, follow-up of graduates, demographic profiles of students and teachers and utilization of facilities. Information/data can be converted to give indicators on manpower requirements, labor supply, and manpower development sources (education and training).

The VEMIS emphasizes supply (B), education and training (C) and demand (D) elements of the model. The overall VEMIS process focuses on the information (A) element of the review framework.

Project Baseline

One of the most elaborate national efforts to examine manpower information has been Project Baseline sponsored by the National Advisory Council on Vocational Education. The basic report and supplemental reports are cited in the bibliography.

> Project Baseline was established to get the information everyone needs and no one seems to have. It is a joint undertaking. The Appropriation Committees of Congress asked for it and directed that specific funds be used to carry it out. The National Advisory Council on Vocational Education was asked to be the agency to do the job. The U.S. Office of Education has provided the funds and contracted with Northern Arizona University to provide the staff. Technical Education Research Center, Inc., has conducted a significant part of the research. Dr. Mel Barlow at UCLA coordinated much of the data analysis. (Report No. 2, page 3)

A series of reports from Project Baseline identify the data/information needed by Congress and the U.S. Office of Education about vocational education. The data/information focuses on courses, students or trainee information and professional personnel information.

Project Baseline emphasizes information (A), students (indirectly supply—B), and education and training (C). Obviously, information about ABC can shed light on demand (D).

Summary

The six projects identified here are only a sample of the many national, state and local efforts to design, demonstrate and report on manpower information systems. Table 3 illustrates the emphasis of these projects which can be compared to the FY74 USOE funded efforts in Table 2. It appears that these six projects have had funding to examine more than one of the review framework elements.

TABLE 3

Model Emphasis of Related Manpower Information Systems

PROJECTS	MODEL EMPHASIS			
	(A) Information	(B) Supply	(C) Education & Training	(D) Demand
ISVD	X	X	X	
OTIS		X		X
VIEW	X		X	X
INFOE	X		X	X
VEMIS		X	X	X
PROJECT BASELINE	X	X	X	

Conclusions and Recommendations

1. The manpower information and system priority is a very broad statement allowing for a wide range of national, state and local project activities. It is recommended that USOE or appropriate agencies develop an overall plan for having manpower information systems installed and operational in each state by a specified target date. The plan would incorporate findings from Part C Projects from FY74 and FY75. The integration of project findings and state progress toward operational manpower information systems could be used as a guide for supporting subsequent project activities under the priority.

2. Final project reports were apparently developed without a format or content guide. As a result they tended to be compliance documents that omitted specific reference to the funding priority and reporting of accomplishments for parts of the priority statement. From project titles (see Table 2) it was difficult to determine what priority was being reported. It is recommended that specific guidelines be provided project directors for preparation of abstracts or the entire final project report that reflects the funding priority and findings that are related to the priority.

3. The problem of using secondary data sources or collecting original data for manpower information systems continues. Both approaches have methodological and cost barriers. No resolution to this issue was identified in this review and synthesis. For example Morton (No. 11) in Oklahoma compared the use of two projection techniques finding that they did differ on cost and Bice and Smith (No. 17) used existing data for the three-state regional information system. However, no project compared the use of existing information with collection of raw data for manpower information purposes. It is recommended that this problem be incorporated into the overall plan for studying manpower information systems (Re: Conclusion/Recommendation 1).

4. A single approach or best system for gathering and reporting manpower information was not identified in the review and synthesis. It is recommended that the USOE develop general guidelines for the basic requirements of a manpower information system. The USOE supported project (Porter No. 10) to develop a "minimal" information requirements procedure is a positive step in this direction.

5. There is a need for collecting and reporting the findings of USOE supported projects and incorporating the information into a coordinated system. This activity would include the study of project activities and a procedure for documenting the advancement of knowledge (state of the art) in areas such as manpower information systems. It is recommended that this activity be completed periodically; possibly annually but not more than five year intervals. This could be accomplished as part of conclusion/recommendation 1 on the previous page.

6. The USOE/DOL interagency agreement and the committees of administrators studying the specifics of the agreement could address all of these conclusions and recommendations. It is recommended that the committee work with each state to minimize the problems identified in this review and synthesis.

7. Another situation which was identified by reviewers was the need to adopt standard terminology for manpower information systems study and development. The Stevens project in Missouri (No. 7) provides a start toward understanding terms and the alternative approaches for using data for planning. It is recommended that the USOE provide a handbook of terminology dealing with manpower information systems and planning. Terms especially abused include supply, demand, manpower and others.

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OTIS Reports

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VIEW Reports

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This and other reports on VEMIS can be fouhd in the ERIC system by using VEMIS as an identifier. Other states such as Virginia have used VEMIS which is identified as VEMIS V.

Project Baseline Reports

TITLE	ED NUMBER
Learning a Living Across the Nation, Volume I	ED 095 309
Learning a Living Across the Nation, Volume II	ED 095 310
Learning a Living Across the Nation, Volume III, Part 1	ED 099 684
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